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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,150	01/14/2002	Arnin Schoppach	(Z) 99038 P US	4347

7590 03/31/2006  
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EXAMINER

PRITCHETT, JOSHUA L

ART UNIT PAPER NUMBER

2872

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/047,150

Applicant(s)

SCHOPPACH ET AL.

Examiner

Joshua L. Pritchett

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-27 and 36-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-27 and 36-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date: 11/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This action is in response to Amendment filed January 11, 2006. Claims 43-56 have been added as requested by the applicant.

#### ***Claim Objections***

Claims 38 and 39 are objected to because of the following informalities: the claims depend from claim 20 which does not provide proper support for the limitations “the mirror mounting” or “the mirror member” as stated in claims 38 and 39 respectively. Appropriate correction is required.

Claim 45 is objected to because of the following informalities: the claim states that the mirror member is made of quartz and that the mirror member is made of SiN and that the mirror member. The claim also states that the compensation elements are made of titanium and that the compensation elements are made of invar. The examiner cannot readily discern which combination of materials the applicant is actually claiming. For the purpose of examination the claim will be examined as if the mirror member is SiN and the compensation elements are titanium. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 20, 21, 23, 38 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Dilworth (US 4,116,537).

Regarding claim 20, Dilworth discloses a first optical element (150), the first optical element having a focal point (col. 2 lines 65-68); a further optical element (110); compensating elements (116,117,129,130); the first optical element is connected to the further optical element by means of a mounting (155,157) and compensating elements (Fig. 2); the first optical element and the further optical element defining an axial direction (Fig. 2); the compensating elements being arranged in a region of the first optical element providing thermal conductivity from the first optical element to the compensating elements so that the compensating elements undergo approximately a same temperature change as the first optical element, and the compensating elements having a length in the axial direction and being made from a material so as to displace the further optical element from the first optical element in a same amount as a displacement of the focal point occurs because of heating of the first optical element (col. 2 line 62 – col. 3 line 26; 116,117,129 and 130 correspond to 16,17,29 and 30 respectively).

Regarding claim 21, Dilworth discloses at least one of the first and further optical elements comprises a lens (col. 2 lines 13-14).

Regarding claim 23, Dilworth discloses the compensating elements have a thermal expansion coefficient deviating from that of the mounting (col. 3 lines 15-26).

Regarding claims 38 and 39, Dilworth discloses the compensating elements are connected on one side with the mounting and on the other side with the mirror mounting (Fig. 2).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22, 36 and 37 rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Fruit ("A New Concept in Telescope Design SiC as the Only Material for Mirrors and Structure").

Dilworth teaches the invention as claimed but lacks reference to the claimed materials. Fruit teaches a material for mounting with a density of at least  $2.5 \times 10^3 \text{ kg/m}^3$  (Fig. 1). Fruit teaches the use of C/C SiC (page 2 section 3). Fruit teaches the telescope used in orbit (page 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Dilworth invention include the materials of Fruit for the purpose of allowing the

telescope to withstand the forces exerted on the structure during a launch into orbit and still remain functional.

Claims 24, 25, 27 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Jutte (US 4,098,476).

Regarding claims 24 and 41, Dilworth teaches a first optical element (150), the first optical element having a focal point (col. 2 lines 65-68); a further optical element (110); compensating elements (116,117,129,130); the first optical element is connected to the further optical element by means of a mounting (155,157) and compensating elements (Fig. 2); the first optical element and the further optical element defining an axial direction (Fig. 2); the compensating elements being arranged in a region of the first optical element providing thermal conductivity from the first optical element to the compensating elements so that the compensating elements undergo approximately a same temperature change as the first optical element, and the compensating elements having a length in the axial direction and being made from a material so as to displace the further optical element from the first optical element in a same amount as a displacement of the focal point occurs because of heating of the first optical element (col. 2 line 62 – col. 3 line 26; 116,117,129 and 130 correspond to 16,17,29 and 30 respectively). Dilworth lacks reference to the mirror carrier comprising quartz and the compensating elements being titanium. It is extremely well known in the art to use quartz to carry a mirror surface. Official Notice is taken. Jutte teaches the compensation elements for a telescope being titanium (col. 1 lines 62-68). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the compensating elements of Dilworth be

titanium as taught by Jutte and a quartz mirror carrier as is known in the art for the purpose of producing a telescope that can withstand a high magnitude of stress.

Regarding claim 25, Dilworth teaches at least one of the first and further optical elements comprises a lens (col. 2 lines 13-14).

Regarding claim 27, Dilworth teaches the compensating elements have a thermal expansion coefficient deviating from that of the mounting (col. 3 lines 15-26).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Jutte (US 4,098,476) as applied to claim 24 above, and further in view of Fruit ("A New Concept in Telescope Design SiC as the Only Material for Mirrors and Structure").

Dilworth in combination with Jutte teaches the invention as claimed but lacks reference to the claimed materials. Fruit teaches a material for mounting with a density of at least  $2.5 \times 10^3 \text{ kg/m}^3$  (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Dilworth invention include the materials of Fruit for the purpose of allowing the telescope to withstand the forces exerted on the structure during a launch into orbit and still remain functional.

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Neil (US 5,579,333).

Dilworth teaches the invention as claimed but lacks reference to a mirror carrier made of SiN. Neil teaches the mirror carrier made of SiN (abstract). It would have been obvious to one

of ordinary skill in the art at the time the invention was made to have the Dilworth invention include a mirror carrier made of SiN as taught by Neil for the purpose of efficiently reflecting incident light rays.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Jutte (US 4,098,476) as applied to claim 24 above, and further in view of Neil (US 5,579,333).

Dilworth teaches the invention as claimed but lacks reference to the claimed materials. Neil teaches the mirror carrier made of SiN (abstract). Jutte teaches the compensation elements for a telescope being titanium (col. 1 lines 62-68). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the compensating elements of Dilworth be titanium as taught by Jutte for the purpose of producing a telescope that can withstand a high magnitude of stress. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Dilworth invention include a mirror carrier made of SiN as taught by Neil for the purpose of efficiently reflecting incident light rays.

Claims 43, 44, 46-53 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Harnisch ("Ultra lightweight C/SiC Mirror and Structures").

Regarding claims 43, 48 and 55, Dilworth teaches a first optical element (150), the first optical element having a focal point (col. 2 lines 65-68); a further optical element (110); compensating elements (116, 117, 129, 130); the first optical element is connected to the further



optical element by means of a mounting (155,157) and compensating elements (Fig. 2); the first optical element and the further optical element defining an axial direction (Fig. 2); the compensating elements being arranged in a region of the first optical element providing thermal conductivity from the first optical element to the compensating elements so that the compensating elements undergo approximately a same temperature change as the first optical element, and the compensating elements having a length in the axial direction and being made from a material so as to displace the further optical element from the first optical element in a same amount as a displacement of the focal point occurs because of heating of the first optical element (col. 2 line 62 – col. 3 line 26; 116,117,129 and 130 correspond to 16,17,29 and 30 respectively). Dilworth lacks reference to the density of the material. Harnisch teaches the density of the material being at most  $2.5 \times 10^3 \text{ kg/m}^3$  (page 4 col. 1). Harnisch teaches C/C SiC with a density being  $2.23 \times 10^3 \text{ kg/m}^3$  (page 4 col. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the density of the compensating elements as taught by Harnisch for the purpose of having the telescope be lightweight and therefore more portable.

Regarding claim 44, Dilworth teaches at least one of the optical elements being a mirror (col. 2 lines 13-14).

Regarding claim 46, Dilworth teaches at least one of the optical elements comprises a lens (col. 2 lines 13-14).

Regarding claim 47, Dilworth teaches the optical system comprises a telescope with a primary mirror and a secondary mirror (Fig. 2; col. 2 lines 13-14).

Regarding claim 49, Dilworth teaches the compensation elements are arranged in a region of one of the optical elements coaxial with the optical axis (Fig. 2).

Regarding claim 50, Dilworth teaches the compensation elements are coaxial with the primary mirror (Fig. 2).

Regarding claim 51, Dilworth teaches the invention as claimed but lacks reference to a telescope tube and the size. It is extremely well known in the art to provide a tube to enclose a telescope to prevent stray light from distorting the image obtained. Official Notice is taken. It is also well within the ability of one of ordinary skill in the art to have the size of the Dilworth telescope be at least three feet. Changes in size have been held to be within the skill of one of ordinary skill in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the telescope of Dilworth include a tube for the purpose of blocking stray light that could distort the image obtained by the telescope.

Regarding claim 52, Dilworth teaches the compensation elements support a mirror carrier carrying a mirror surface of the primary mirror (Fig. 2).

Regarding claim 53, Dilworth teaches the compensation elements have a thermal expansion coefficient deviating from that of the mounting (col. 3 lines 15-26).

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Jutte (US 4,098,476) and Neil (US 5,579,333).

Dilworth teaches a mirror (150) comprising a mirror member carrying surface (Fig. 2), which mirror member is further connected to a further optical element (110) by means of a mounting and compensating elements (116,117,129,130; Fig. 2). Dilworth lacks reference to the

claimed materials. Neil teaches the mirror carrier made of SiN (abstract). Jutte teaches the compensation elements for a telescope being titanium (col. 1 lines 62-68). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the compensating elements of Dilworth be titanium as taught by Jutte for the purpose of producing a telescope that can withstand a high magnitude of stress. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Dilworth invention include a mirror carrier made of SiN as taught by Neil for the purpose of efficiently reflecting incident light rays.

Claims 54 and 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dilworth (US 4,116,537) in view of Harnisch ("Ultra lightweight C/SiC Mirror and Structures") as applied to claim 44 above further in view of Neil (US 5,579,333).

Regarding claim 54, Dilworth teaches the invention as claimed but lacks reference to a mirror carrier made of SiN. Neil teaches the mirror carrier made of SiN (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the Dilworth invention include a mirror carrier made of SiN as taught by Neil for the purpose of efficiently reflecting incident light rays.

Regarding claim 56, Dilworth teaches the mirror members connected directly to a mounting element for isostatic mounting and the mounting is mounted to the mirror member (Fig. 2).

***Response to Arguments***

Applicant's arguments, see Amendment, filed January 11, 2006, with respect to the rejection(s) of claim(s) 20 under Hull have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Dilworth. Applicant submitted foreign priority papers to perfect the foreign priority date to overcome the Hull reference. Dilworth is now used to reject the claimed limitations.


### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joshua L. Pritchett whose telephone number is 571-272-2318. The examiner can normally be reached on Monday - Friday 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLP *JP*

A handwritten signature in black ink, appearing to read "Drew A. Dunn", with a stylized flourish at the end.

**DREW A. DUNN**  
**SUPERVISORY PATENT EXAMINER**